

MAR 19 2007

PATENT APPLN. NO. 10/796,286
RESPONSE UNDER 37 C.F.R. §1.111

PATENT
NON-FINAL

REMARKS

For convenience, the headings used in the Action will be used in the response.

Specification

The title of the invention is objected to as not being descriptive. The title has been amended according to the suggestion provided by the Office.

The specification has been amended to capitalize trademarks.

Removal of the objections to the specification is believed to be in order and is respectfully requested.

Claim Objections

Claim 39 has been amended to correct the spelling of "methylphenylvinylsilsesquioxane". Claim 46 has been canceled.

Removal of the objections to the claims is believed to be in order and is respectfully requested.

Claim Rejections - 35 USC § 112

Claims 37 and 46-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 47 is included in the rejection because it depends on claim 46.

Claims 37 and 46 have been canceled. Claim 47 has been amended to recite a dependency on claim 34. Removal of the 35 U.S.C. 112 rejection is believed to be in order and is respectfully requested.

Claim Rejections - 35 USC § 102

Prior to discussing the prior art rejections of the claims, applicants note that claim 1 has been amended to limit the dielectric materials to a non Si-H containing dielectric material. Claim 33 has been amended by replacing "organic/inorganic" with --organosiloxane--. Claim 15 has been canceled.

Claims 1, 33, 39, 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Chandra et al. (U.S. Patent No. 5,059,448) (hereinafter: "Chandra"). The curing process of Chandra consists of reaction of Si-H functionality in presence of metal catalysts (platinum, rhodium). The process of the present application according to amended claim 1, has a curing mechanism without Si-H, that is, the curing mechanism of the process of the present application is between Si-OH groups. The system of the present application does not need metallic catalysts that are known to be highly problematic in IC-processes.

Claims 1, 33, 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Grill et al. (U.S. Patent No. 6,030,904)

(hereinafter: "Grill"). Grill discloses a process for curing carbon-based films with rapid thermal annealing. The reference includes the possibility of "additives", consisting of oxygen, nitrogen, germanium, silicon". This, however, is not applicable since the material of Grill is still carbon-based. The material of the present application, according to claim 33 as amended, is an organosiloxane material, i.e., siloxane based material with organic functionalities.

Claims 1, 33, 39, 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Sharangpani et al. (U.S. Patent No. 6,303,524 B1) (hereinafter: "Sharangpani"). Sharangpani teaches a RTP-curing process for commercially available dielectric materials. Sharangpani claims low-k being $k=3.9$ or less. The system of the present application has functional groups that decompose during the curing process, and thus much lower k-values are obtained (see Table 1: $2.36 < k < 2.62$). These cannot be obtained by using commercially available products (hydrogen or methyl silsesquioxanes) as Sharangpani uses.

Claims 1, 31, 33-34, 39, 46, 73-75 are rejected under 35 U.S.C. 102(b) as being anticipated by Ramos et al. (U.S. Patent No. 6,372,666 B1) (hereinafter: "Ramos"). Ramos claims a complex hot plate process for curing nanoporous silica material. A crucial

step for the process is "gelling and aging" their films in ammonia vapors, before hot plate curing, as explained in Example 1. The material of the present application is porogen containing siloxane material, that creates low-k values and which does not require any complex ammonia vapor treatment. Using such ammonia vapor treatment is unusual commercially. The materials of the present application are silsesquioxanes with cyclic aliphatic alkenyl, or aromatics with more than 12 carbons. Also, the curing apparatus of the present application differs greatly from the hot plate system of Ramos.

Removal of the 35 U.S.C. 102(b) rejections of the claims is believed to be in order and is respectfully requested.

Claim Rejections - 35 USC § 103

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ramos as applied to claim 33 above, and further in view of Yahagi et al. (U.S. No. 2003/0092854 A1) (hereinafter: "Yahagi"). Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ramos as applied to claim 33 above, and further in view of Usami (U.S. 2001/0017402 A1) (hereinafter: "Usami"). Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ramos as applied to claim 1 above, and further in view of Grill. Claim 76 is rejected under 35 U.S.C. 103(a) as being

unpatentable over Ramos as applied to claim 73 above, and further in view of Yamakawa et al. (U.S. 6,518,204 B2) (hereinafter: "Yamakawa").

The propriety of each of these rejections depends on the propriety of the 35 U.S.C. 102(b) rejection of claims 1, 33 and 73. Since claims 1, 33 and 73 have been shown to be patentable over Ramos, claims 40, 41 and 76 are also patentable.

Removal of the 35 U.S.C. 103(a) rejections of the claims is believed to be in order and is respectfully requested.

Rejoinder of withdrawn claims 2-30, 32, 35-36, 38, 42-45, 48-55, 58-60, 64-72 and 82-83 is also requested in view of the allowability of claim 1. Claim 1 was indicated to be generic to these claims in the action of April 11, 2006. These claims are patentable since they depend directly or indirectly on allowable claim 1.

The foregoing is believed to be a complete and proper response to the Office Action dated September 19, 2006, and is believed to place this application in condition for allowance. If, however, minor issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

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In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,

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